FIG. 1

ATGAATCCATTTCATGCATCTTGTTGGAACACCTCTGCCGAACTTTTAAACAAATCCTGG
AATAAAGAGTTTGCTTATCAAACTGCCAGTGTGGTAGATACAGTCATCCTCCCTTCCATG
ATTGGGATTATCTGTTCAACAGGGCTGGTTGGCAACATCCTCATTGTATTCACTATAATA
AGATCCAGGAAAAAAACAGTCCCTGACATCTATATCTGCAACCTGGCTGTGGCTGATTTG
GTCCACATAGTTGGAATGCCTTTTCTTATTCACCAATGGGCCCGAGGGGGAGAGTGGGTG
TTTGGGGGGCCTCTCTGCACCATCATCACATCCCTGGATACTTGTAACCAATTTGCCTGT
AGTGCCATCATGACTGTAATGAGTGTGGACAGGTACTTTGCCCTCGTCCAACCATTTCGA
CTGACACGTTGGAGAACAAGGTACAAGACCATCCGGATCAATTTGGGCCTTTGGGCAGCT
TCCTTTATCCTGGCATTGCCTGTCTGGGTCTACTCGAAGGTCATCAAATTTAAAGACGGT
GTTGAGAGTTGTGCTTTTGATTTGACATCCCCTGACGATGTACTCTGGTATACACTTTAT
TTGACGATAACAACTTTTTTTTTCCCTCTACCCTTGATTTTGGTGTGCTATATTTTAATT
TTATGCTATACTTGGGAGATGTATCAACAGAATAAGGATGCCAGATGCTGCAATCCCAGT
GTACCAAAACAGAGAGTGATGAAGTTGACAAAGATGGTGCTGGTGCTGGTGGTAGTCTTT
ATCCTGAGTGCTGCCCCTTATCATGTGATACAACTGGTGAACTTACAGATGGAACAGCCC
ACACTGGCCTTCTATGTGGGTTATTACCTCTCCATCTGTCTCAGCTATGCCAGCAGCAGC
ATTAACCCTTTTCTCTACATCCTGCTGAGTGGAAATTTCCAGAAACGTCTGCCTCAAATC
CAAAGAAGAGCGACTGAGAAGGAAATCAACAATATGGGAAACACTCTGAAATCACACTTT
TAG

FIG. 2

MNPFHASCWNTSAELLNKSWNKEFAYQTASVVDTVILPSMIGIICSTGLVGNILIVFTII
RSRKKTVPDIYICNLAVADLVHIVGMPFLIHQWARGGEWVFGGPLCTIITSLDTCNQFAC
SAIMTVMSVDRYFALVQPFRLTRWRTRYKTIRINLGLWAASFILALPVWVYSKVIKFKDG
VESCAFDLTSPDDVLWYTLYLTITTFFFPLPLILVCYILILCYTWEMYQQNKDARCCNPS
VPKQRVMKLTKMVLVLVVVFILSAAPYHVIQLVNLQMEQPTLAFYVGYYLSICLSYASSS
INPFLYILLSGNFQKRLPQIQRRATEKEINNMGNTLKSHF

FIG. 3

CTTCCGTCAGCTGGGACCCGCTGAGAGCCGTTTTTGGTCACGCGCGCTTAGCGGATAGA
CCTGCAGTCCCGCAGAGAGGAAGGGCGCCCGGGCTGTCCGCCGCGCGGGGAGGACGCGAG
CACCCAGGTGACGTCCCGCGGGCCGCCGCGCGAGGGCCGGGCTCTGGCGTGGGCGCGCCC
CAGGGCCCGTGGGCTGCGCGCCCGGGAAGGTCTGGCGCCTGGTCCACCAGTCGCCCCTCC
CCGGGGCTGGCTCGCCGGTAGTGTCTGATTGCTGGGGGATCCCCCTCCATCCCCAGAAGG
TACAAAGTTTGGCTCTGTGGAGGCACCTACGAGACGGAGCGGGGCGGGTGGGTGGCCGGC
TGGTTTCACACTCGGCAAAGAAAATGGAAACACAGGTGGGAAAAGAAAAAGGAGTGGCT
TTCCGGGAAGCAGCGGCCCCGACCGAGACCGCTGGAGCGCGCCGGGCTAGTTCATCCCGG
CTCTCCATGGGGACTAAAGAGGCTGAACTGAAGTGGCGAAGCTTTAATCCCTGGAAAGTC
ACGAACA

FIG. 4

```
GAAAGTACATGGATCACCATGAGTCTAGACATGATTGTCTATCTTACTGGTATTATTAGA
AAGGGCAGGTGTACCGATATGTTTATGCCCATTCTTCTTGTGTACTTGTGACTCTTAGCA
GCATGGAAGAGAAGTGTAACCATGCAAATACAATGAGCTTAATATGCTAACTTTAGCAAG
ATGTAAAATGTTGATCTATATTGTGGGTAGGGAATGGGATAGTCTGAGATACCCAGGCTT
CATGATGGTGTATATTATTTCAGCATATTATAAACTAGTCACTAATGAAAATGGCCATCC
ATGACCATTGACTCAAAACTCACCAAGGAACCTGACCTTGCCCTCCACACTGTGGCCTCA
CTGTAACAGTTTCCTCAAGGTTCCTAGGAGGGTATCACCTTAGAGTGAAGTCTAAAATTT
GGCTATTTTTTATCTATAAAAAATGTCAGTTTTATATGGTCCAATACTAATACCCTCAAC
AACTAAGCCCCACCTTTTAGAATAAGTTACCATTTATTGCACACATGCAATGTGTAAGAT
TACATGTAACAAACCTGTGAAATAAGTATTATTACCTTTGTTTGCTAAGGCTCAGAAAGG
AGAAATGATAGGCCTAATGCTGCAACAGCTATCTAAGAGCTGAGCTAACATTCAGCTCTG
CCTGTTTCTTTTCTACTGCACGACCTTGACAACCTTTACTTATCATACTGGAGAACCCAG
TAACTTGGAGTTTCTTTTGCTTTCTCCTGTAGCCCTACAAGAGGAGAACTAAAGTCTGAT
AGAAATGAGTTGATGTTTTAAGCATCATTTTGGATTATCTTTGTTCTCACACCTGCTAAC
TGTAGAAACTGGCATCTGCACTTTAATAATAATACTTTACTTCTGGACTTTAAGCATAAT
TAGGAAACATTCCTGGCCGGGTGCAGTGGCTCATGCCTGTAATCCCAGCACTTTGGGAGG
TGGAGGCAGGTGGATCACAAAGTCAGAAGTTCAAGACCAGTCTGGCCAACATAGTGAGAC
CCTGTCTACTAAAAATAAAAAAAGATTAGCCGAGCATGGTGGTGTGTGCCTGTAGTCCCA
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GCCGAGATCACGCCACTGCACTCCAGCTTGGGCAATAGAGTGAGACGTCATCTCAAAAAA
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TTTGTTCTAAGGTACAAAAAGTAATTAGCCCTTAAATTTTCATAGGTATTCATTATATCT
ATCTTTCCTCTTTAGACTTATATATAGTTAGGAAAGGAAACAATGCATTTAATGCCTGTG
TTCTACACTAAGACAAATATTGTTATTTTTGCTTGTGGATAAAGTCTGTAAACCCACCTT
CTTCATCTAAATACATTAAATTTGTTTTCTCCGTAAACATCTGAAACCAATTTTCAACCA
GCCCCTTCTAGAAAAAGAGTTAACCATTTTTATATCTGATCTCCATTTTTATATTTCAAT
TGTGTTTGGATAAACTTGTATTTGAATCAACCCAGACGTGATTTTTAACCCTATTTATTT
TACTCTAGAATTTTTAGGCACCATTTCAGAACTGGATAGTATCTAAATGCATATCTGGAT
GAATGGTTCTGTAAACCACATGAGAACTACACACTGAGACAGGTAGCATCTGAAACATTT
TATTTCCATAGCTGAGGTCTAGAGACCTACATATGCAGCTGGATGCTCCTATAAAACGTC
AATAAGAAGCTGTGTCATGGCCACAGTTTCAGGGGTCTTCATTCTCACTTTTCTAAGATG
CAACAGTCCGGGCTCAGTGAATAATATTGACTTCTGAAGACCCAGCACAATGGGTCAGAA
ACATCTTATTATGTGATAATTGAAGAGCAATTGCTTACTTTCATTGTTTTTTTAATACAG
AAAAATATTATGATTTTAAAGACTTAGCTTTAAACCACAGACCTTTTTCTAGTAGCAGTC
CCAATAGTCCTCAAATAATTGGCCAGTGAATTATTTTAAATTATATTTACTAAGAGTTGT
AAGGAGCTTTATTTAGCATTTAATCAAAGTAGAAAATAAAAAGGGTGATTAATAAATTTA
TTTTTGTCCCTTTATATAGCGTTTCTATGCATAAGCATATTTATATGCAGATTTACAGAG
GTGATTTGATAGAGATTCTTTGTGTGTTTTCTATGTTTGGCCATGATATGTATACATGTT
TACTTTCAAATGAAGTTAATAATGATACTTGGGTATTTGTCACTCAGTCAAATAATAATC
GTATCCTTATTCTATTCTTATTCAATTCTAGGTGCCTCATTTAAACTTTGATCTCAATTA
ATAAAAATGAATGAGTAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAG
```

FIG. 5

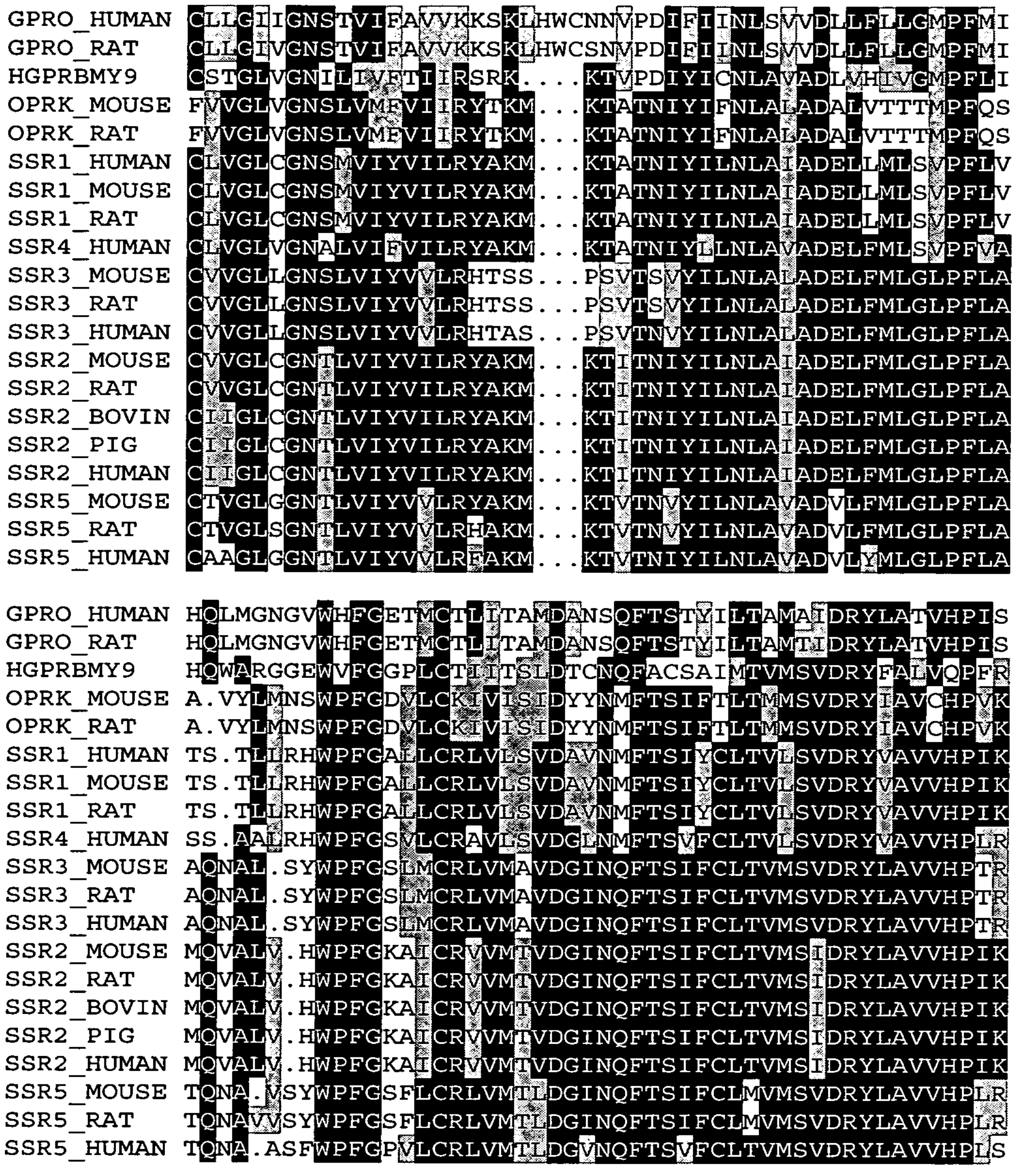
1 MNPFHASCWN TSAELLNKSW NKEFAYQTAS VVDTVILPS**M IGIICSTGLV**
51 **GNILIVFTII** RSRKKTVPD**I YICNLAVADL VHIVGMPFLI** HQWARGGEWV
101 FGGP**LCTIIT SLDTCNQFAC SAIMTVMSV**D RYFALVQPFR LTRWRTRYK**T**
151 **IRINLGLWAA SFILALPVWV Y**SKVIKFKDG VESCAFDLTS PDDVLWYT**LY**
201 **LTITTFFFPL PLILVCYILI** LCYTWEMYQQ NKDARCCNPS VPKQRVMKLT
251 K**MVLVLVVVF ILSAAPYHVI** QLVNLQMEQP T**LAFYVGYYL SICLSYASSS**
301 **INPFLYILL**S GNFQKRLPQI QRRATEKEIN NMGNTLKSHF

FIG. 6A

```
GPRO_HUMAN MLCPSKTDGSGHSGRIHQETHGEGKRDKISNSEGRENGGRGFQMNGGSLE
GPRO_RAT   ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~MD
HGPRBMY9   ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
OPRK_MOUSE ~~~~~~~~~~~~~~~~~~~~~~~~~~~MESPIQIFRGDPGPTCSPSACLL
OPRK_RAT   ~~~~~~~~~~~~~~~~~~~~~~~~~~~MESPIQIFRGEPGPTCAPSACLL
SSR1_HUMAN ~~~~~~~~~~~~~~~~~~~~~~~~~~~MFPNGTASSPSSSPSPSPGSCGE
SSR1_MOUSE ~~~~~~~~~~~~~~~~~~~~~~~~~~~MFPNGTASSPSSSPSPSPGSCGE
SSR1_RAT   ~~~~~~~~~~~~~~~~~~~~~~~~~~~MFPNGTAPSPTSSPSSSPGGCGE
SSR4_HUMAN ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~MSAPSTLPPGGEE
SSR3_MOUSE ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~MATVTYPSSEPMTLD
SSR3_RAT   ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~MAAVTYPSSVPTTLD
SSR3_HUMAN ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~MDMLHPSSVSTTSE
SSR2_MOUSE ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~MEMSSE
SSR2_RAT   ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~MELTSE
SSR2_BOVIN ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~MDLVSE
SSR2_PIG   ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~MDMAYE
SSR2_HUMAN ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~MDMADE
SSR5_MOUSE ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ME
SSR5_RAT   ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ME
SSR5_HUMAN ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ME

GPRO_HUMAN AEHASRMSVLRAKPMSNSQRLLLLSPGSPPRTGSISYIN.IIMPSVFGTI
GPRO_RAT   LQTSLLSTGPNASNISDGQDNLTL.PGSPPRTGSVSYIN.IIMPSVFGTI
HGPRBMY9   ~~~~~~MNPFHASCWNTSAELLNKSWNKEFAYQTASVVDTVILPSMIGII
OPRK_MOUSE PNSSSWFPNWAES..DSNGSVGSED..QQLESAHISPAIPVIITAVYSVV
OPRK_RAT   PNSSSWFPNWAES..DSNGSVGSED..QQLEPAHISPAIPVIITAVYSVV
SSR1_HUMAN GGGSRGPGAGAADGMEEPGRNASQNGT..LSEGQGSA...ILISFIYSVV
SSR1_MOUSE GACSRGPGSGAADGMEEPGRNASQNGT..LSEGQGSA...ILISFIYSVV
SSR1_RAT   GVCSRGPGSGAADGMEEPGRNSSQNGT..LSEGQGSA...ILISFIYSVV
SSR4_HUMAN GLGTAWP..SAANASSAPAE..AEEAV..AGPGDARAAGMVAIQCIYALV
SSR3_MOUSE PGNTSST..W...PLDT..TLG..NTSAGASLT.GLAVSGILISLVYLVV
SSR3_RAT   PGNASSA..W...PLDT..SLG..NASAGTSLA.GLAVSGILISLVYLVV
SSR3_HUMAN PENASSA..W...PPDA..TLG..NVSAGPSPA.GLAVSGVLIPLVYLVV
SSR2_MOUSE QLN..GSQVWVSSPFDLNGSLGPSNGSNQTEPYYDMTSNAVLT.FIYFVV
SSR2_RAT   QFN..GSQVWIPSPFDLNGSLGPSNGSNQTEPYYDMTSNAVLT.FIYFVV
SSR2_BOVIN .LN..ETQPWLTTPFDLNGSVGAANISNQTEPYYDLASNVVLT.FIYFVV
SSR2_PIG   LLN..GSQPWLSSPFDLNGSVATANSSNQTEPYYDLTSNAVLT.FIYFVV
SSR2_HUMAN PLN..GSHTWLSIPFDLNGSVVSTNTSNQTEPYYDLTSNAVLT.FIYFVV
SSR5_MOUSE PLSLASTPSWNAS...A.ASSGSHNWS.LVDPVSPMGARAVLVPVLYLLV
SSR5_RAT   PLSLASTPSWNAS...A.ASSGNHNWS.LVGSASPMGARAVLVPVLYLLV
SSR5_HUMAN PLFPASTPSWNASSPGA.ASGGGDNRT.LVGPAPSAGARAVLVPVLYLLV
```

FIG. 6B



```
GPRO_HUMAN   CLLGIIGNSTVIFAVVKKSKLHWCNNVPDIFIINLSVVDLLFLLGMPFMI
GPRO_RAT     CLLGIVGNSTVIFAVVKKSKLHWCSNVPDIFIINLSVVDLLFLLGMPFMI
HGPRBMY9     CSTGLVGNILIVFTIIRSRK....KTVPDIYICNLAVADLVHLVGMPFLI
OPRK_MOUSE   FVVGLVGNSLVMFVIIRYTKM...KTATNIYIFNLALADALVTTTMPFQS
OPRK_RAT     FVVGLVGNSLVMFVIIRYTKM...KTATNIYIFNLALADALVTTTMPFQS
SSR1_HUMAN   CLVGLCGNSMVIYVILRYAKM...KTATNIYILNLAIADELLMLSVPFLV
SSR1_MOUSE   CLVGLCGNSMVIYVILRYAKM...KTATNIYILNLAIADELLMLSVPFLV
SSR1_RAT     CLVGLCGNSMVIYVILRYAKM...KTATNIYILNLAIADELLMLSVPFLV
SSR4_HUMAN   CLVGLVGNALVIFVILRYAKM...KTATNIYLLNLAVADELFMLSVPFVA
SSR3_MOUSE   CVVGLLGNSLVIYVVLRHTSS...PSVTSVYILNLALADELFMLGLPFLA
SSR3_RAT     CVVGLLGNSLVIYVVLRHTSS...PSVTSVYILNLALADELFMLGLPFLA
SSR3_HUMAN   CVVGLLGNSLVIYVVLRHTAS...PSVTNVYILNLALADELFMLGLPFLA
SSR2_MOUSE   CVVGLCGNTLVIYVILRYAKM...KTITNIYILNLAIADELFMLGLPFLA
SSR2_RAT     CVVGLCGNTLVIYVILRYAKM...KTITNIYILNLAIADELFMLGLPFLA
SSR2_BOVIN   CIIGLCGNTLVIYVILRYAKM...KTITNIYILNLAIADELFMLGLPFLA
SSR2_PIG     CIIGLCGNTLVIYVILRYAKM...KTITNIYILNLAIADELFMLGLPFLA
SSR2_HUMAN   CIIGLCGNTLVIYVILRYAKM...KTITNIYILNLAIADELFMLGLPFLA
SSR5_MOUSE   CTVGLGGNTLVIYVVLRYAKM...KTVTNVYILNLAVADVLFMLGLPFLA
SSR5_RAT     CTVGLSGNTLVIYVVLRHAKM...KTVTNVYILNLAVADVLFMLGLPFLA
SSR5_HUMAN   CAAGLGGNTLVIYVVLRFAKM...KTVTNIYILNLAVADVLYMLGLPFLA

GPRO_HUMAN   HQLMGNGVWHFGETMCTLITAMDANSQFTSTYILTAMAIDRYLATVHPIS
GPRO_RAT     HQLMGNGVWHFGETMCTLITAMDANSQFTSTYILTAMTIDRYLATVHPIS
HGPRBMY9     HQWARGGEWVFGGPLCTIITSLDTCNQFACSAIMTVMSVDRYFALVQPFR
OPRK_MOUSE   A.VYLMNSWPFGDVLCKIVISIDYYNMFTSIFTLTMMSVDRYIAVCHPVK
OPRK_RAT     A.VYLMNSWPFGDVLCKIVISIDYYNMFTSIFTLTMMSVDRYIAVCHPVK
SSR1_HUMAN   TS.TLLRHWPFGALLCRLVLSVDAVNMFTSIYCLTVLSVDRYVAVVHPIK
SSR1_MOUSE   TS.TLLRHWPFGALLCRLVLSVDAVNMFTSIYCLTVLSVDRYVAVVHPIK
SSR1_RAT     TS.TLLRHWPFGALLCRLVLSVDAVNMFTSIYCLTVLSVDRYVAVVHPIK
SSR4_HUMAN   SS.AALRHWPFGSVLCRAVLSVDGLNMFTSVFCLTVLSVDRYVAVVHPLR
SSR3_MOUSE   AQNAL.SYWPFGSLMCRLVMAVDGINQFTSIFCLTVMSVDRYLAVVHPTR
SSR3_RAT     AQNAL.SYWPFGSLMCRLVMAVDGINQFTSIFCLTVMSVDRYLAVVHPTR
SSR3_HUMAN   AQNAL.SYWPFGSLMCRLVMAVDGINQFTSIFCLTVMSVDRYLAVVHPTR
SSR2_MOUSE   MQVALV.HWPFGKAICRVVMTVDGINQFTSIFCLTVMSIDRYLAVVHPIK
SSR2_RAT     MQVALV.HWPFGKAICRVVMTVDGINQFTSIFCLTVMSIDRYLAVVHPIK
SSR2_BOVIN   MQVALV.HWPFGKAICRVVMTVDGINQFTSIFCLTVMSIDRYLAVVHPIK
SSR2_PIG     MQVALV.HWPFGKAICRVVMTVDGINQFTSIFCLTVMSIDRYLAVVHPIK
SSR2_HUMAN   MQVALV.HWPFGKAICRVVMTVDGINQFTSIFCLTVMSIDRYLAVVHPIK
SSR5_MOUSE   TQNA.VSYWPFGSFLCRLVMTLDGINQFTSIFCLMVMSVDRYLAVVHPLR
SSR5_RAT     TQNAVVSYWPFGSFLCRLVMTLDGINQFTSIFCLMVMSVDRYLAVVHPLR
SSR5_HUMAN   TQNA.ASFWPFGPVLCRLVMTLDGVNQFTSVFCLTVMSVDRYLAVVHPLS
```

FIG. 6C

```
GPRO_HUMAN  STKFRKPSVATLVICL.LWALSFISITPVWLYARL.IPFPGGAVGCGIRL
GPRO_RAT    STKFRKPSMATLVICL.LWALSFISITPVWLYARL.IPFPGGAVGCGIRL
HGPRBMY9    LTRWR.TRYKTIRINLGLWAASFILALPVWVYSKV.IKFKDGVESCAFDL
OPRK_MOUSE  ALDFRTPLKAKI.INICIWLLASSVGISAIVLGGTKVREDVDVIECSLQF
OPRK_RAT    ALDFRTPLKAKI.INICIWLLASSVGISAIVLGGTKVREDVDVIECSLQF
SSR1_HUMAN  AARYRRPTVAKV.VNLGVWVLSLLVILPIVVFSRT.AANSDGTVACNMLM
SSR1_MOUSE  AARYRRPTVAKV.VNLGVWVLSLLVILPIVVFSRT.AANSDGTVACNMLM
SSR1_RAT    AARYRRPTVAKV.VNLGVWVLSLLVILPIVVFSRT.AANSDGTVACNMLM
SSR4_HUMAN  AATYRRPSVAKL.INLGVWLASLLVTLPIAIFADTRPARGGQAVACNLQW
SSR3_MOUSE  SARWRTAPVART.VSRAVWVASAVVVLPVVVFSGVP.R...GMSTCHMQW
SSR3_RAT    SARWRTAPVARM.VSAAVWVASAVVVLPVVVFSGVP.R...GMSTCHMQW
SSR3_HUMAN  SARWRTAPVART.VSAAVWVASAVVVLPVVVFSGVP.R...GMSTCHMQW
SSR2_MOUSE  SAKWRRPRTAKM.INVAVWCVSLLVILPIMIYAGLR.SNQWGRSSCTINW
SSR2_RAT    SAKWRRPRTAKM.INVAVWGVSLLVILPIMIYAGLR.SNQWGRSSCTINW
SSR2_BOVIN  SAKWRRPRTAKM.INVAVWGVSLLVILPIMIYAGLR.SNQWGRSSCTINW
SSR2_PIG    SAKWRRPRTAKM.INVAVWGVSLLVILPIMIYAGLR.SNQWGRSSCTINW
SSR2_HUMAN  SAKWRRPRTAKM.ITMAVWGVSLLVILPIMIYAGLR.SNQWGRSSCTINW
SSR5_MOUSE  SARWRRPRVAKL.ASAAVWVFSLLMSLPLLVFADVQ.EG.WG..TCNLSW
SSR5_RAT    SARWRRPRVAKM.ASAAVWVFSLLMSLPLLVFADVQ.EG.WG..TCNLSW
SSR5_HUMAN  SARWRRPRVAKL.ASAAAWVLSLCMSLPLLVFADVQ.EG..G..TCNASW

GPRO_HUMAN  PNPDTDLYWFT....LYQFFLAFALPFVVITAAYVRIL.....QRMTSSV
GPRO_RAT    PNPDTDLYWFT....LYQFFLAFALPFVVITAAYVKIL.....QRMTSSV
HGPRBMY9    TSPD.DVLWYT....LYLTITTFFFPLPLILVCYILILCYTWEMYQQNKD
OPRK_MOUSE  PDDEY..SWWDLFMKICVFVFAFVIPVLIIIVCYTLMILRLKSVRL....
OPRK_RAT    PDDEY..SWWDLFMKICVFVFAFVIPVLIIIVCYTLMILRLKSVRL....
SSR1_HUMAN  PEPAQ..RWLVGFV.LYTFLMGFLLPVGAICLCYVLIIAKMRMVALKA..
SSR1_MOUSE  PEPAQ..RWLVGFV.LYTFLMGFLLPVGAICLCYVLIIAKMRMVALKA..
SSR1_RAT    PEPAQ..RWLVGFV.LYTFLMGFLLPVGAICLCYVLIIAKMRMVALKA..
SSR4_HUMAN  PHPA....WSAVFV.VYTFLLGFLLPVLAIGLCYLLIVGKMRAVALRA..
SSR3_MOUSE  PEPAA..AWRTAFI.IYMAALGFFGPLLVICLCYLLIVVKVRSTTRRVRA
SSR3_RAT    PEPAA..AWRTAFI.IYTAALGFFGPLLVICLCYLLIVVKVRSTTRRVRA
SSR3_HUMAN  PEPAA..AWRAGFI.IYTAALGFFGPLLVICLCYLLIVVKVRSAGRRV..
SSR2_MOUSE  PGESG..AWYTGFI.IYAFILGFLVPLTIICLCYLFIIIKVKSSGIRV..
SSR2_RAT    PGESG..AWYTGFI.IYAFILGFLVPLTIICLCYLFIIIKVKSSGIRV..
SSR2_BOVIN  PGESG..AWYTGFI.IYAFILGFLVPLTIICLCYLFIIIKVKSSGIRV..
SSR2_PIG    PGESG..AWYTGFI.IYAFILGFLVPLTIICLCYLFIIIKVKSSGIRV..
SSR2_HUMAN  PGESG..AWYTGFI.IYTFILGFLVPLTIICLCYLFIIIKVKSSGIRV..
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SSR5_RAT    PEPVG..LWGAAFI.TYTSVLGFFGPLLVICLCYLLIVVKVKAAGMRV..
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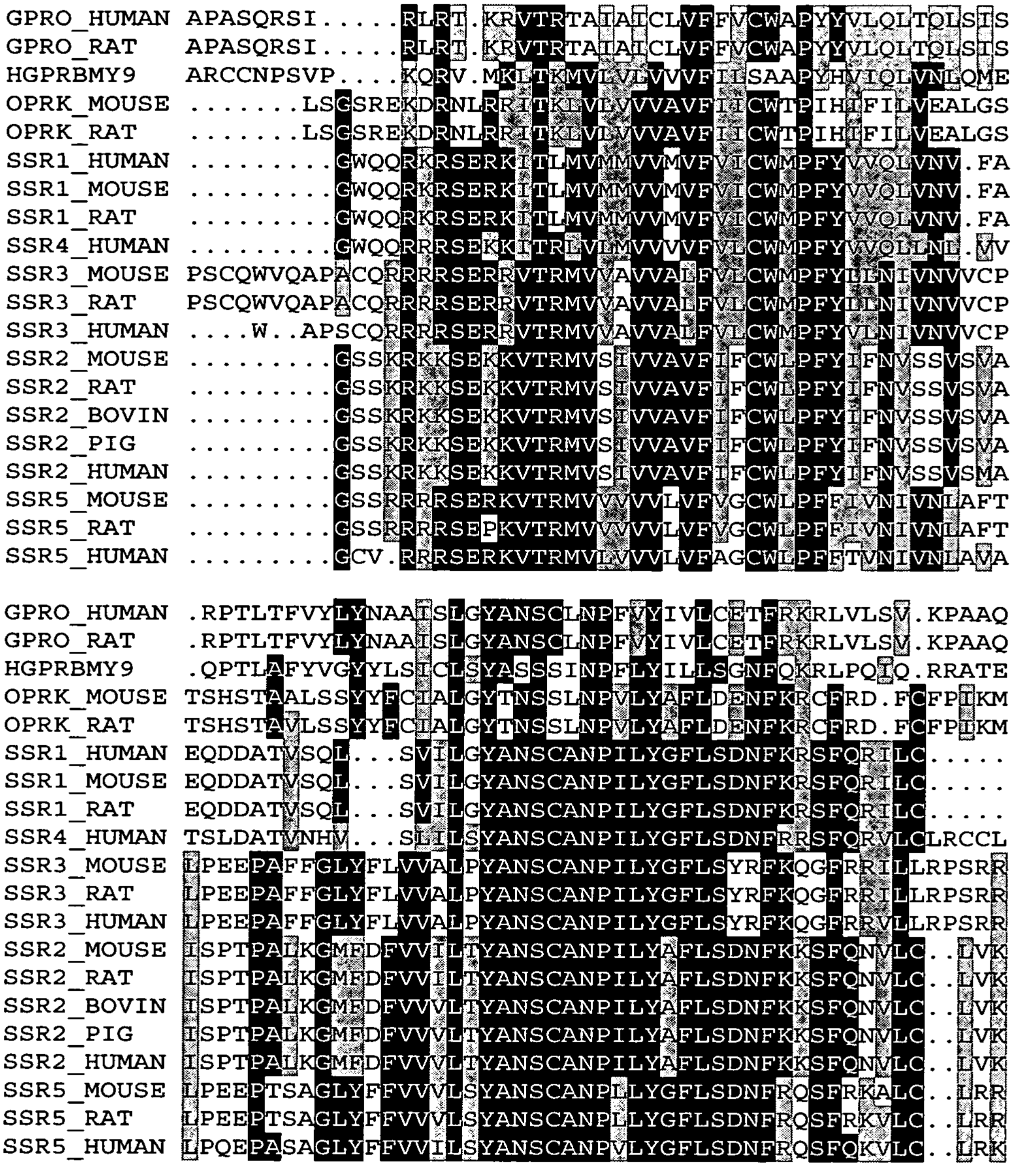
FIG. 6D



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GPRO_HUMAN   APASQRSI.....RLRT.KRVTRTAIAICLVFFVCWAPYYVLQLTQLSIS
GPRO_RAT     APASQRSI.....RLRT.KRVTRTAIAICLVFFVCWAPYYVLQLTQLSIS
HGPRBMY9     ARCCNPSVP....KQRV.MKLTKMVLVLVVVFILSAAPYHVIQLVNLQME
OPRK_MOUSE   .......LSGSREKDRNLRRITKLVLVVVAVFIICWTPIHIFILVEALGS
OPRK_RAT     .......LSGSREKDRNLRRITKLVLVVVAVFIICWTPIHIFILVEALGS
SSR1_HUMAN   .........GWQQRKRSERKITLMVMMVVMVFVICWMPFYVVQLVNV.FA
SSR1_MOUSE   .........GWQQRKRSERKITLMVMMVVMVFVICWMPFYVVQLVNV.FA
SSR1_RAT     .........GWQQRKRSERKITLMVMMVVMVFVICWMPFYVVQLVNV.FA
SSR4_HUMAN   .........GWQQRRRSEKKITRLVLMVVVVFVLCWMPFYVVQLLNL.MV
SSR3_MOUSE   PSCQWVQAPACQRRRRSERRVTRMVVAVVALFVLCWMPFYLLNIVNVVCP
SSR3_RAT     PSCQWVQAPACQRRRRSERRVTRMVVAVVALFVLCWMPFYLLNIVNVVCP
SSR3_HUMAN   ....W..APSCQRRRRSERRVTRMVVAVVALFVLCWMPFYVLNIVNVVCP
SSR2_MOUSE   .........GSSKRKKSEKKVTRMVSIVVAVFIFCWLPFYIFNVSSVSVA
SSR2_RAT     .........GSSKRKKSEKKVTRMVSIVVAVFIFCWLPFYIFNVSSVSVA
SSR2_BOVIN   .........GSSKRKKSEKKVTRMVSIVVAVFIFCWLPFYIFNVSSVSVA
SSR2_PIG     .........GSSKRKKSEKKVTRMVSIVVAVFIFCWLPFYIFNVSSVSVA
SSR2_HUMAN   .........GSSKRKKSEKKVTRMVSIVVAVFIFCWLPFYIFNVSSVSMA
SSR5_MOUSE   .........GSSRRRRSERKVTRMVVVVVLVFVGCWLPFFIVNIVNLAFT
SSR5_RAT     .........GSSRRRRSEPKVTRMVVVVVLVFVGCWLPFFIVNIVNLAFT
SSR5_HUMAN   .........GCV.RRRSERKVTRMVLVVVLVFAGCWLPFFTVNIVNLAVA

GPRO_HUMAN   .RPTLTFVYLYNAAISLGYANSCLNPFVYIVLCETFRKRLVLSV.KPAAQ
GPRO_RAT     .RPTLTFVYLYNAAISLGYANSCLNPFVYIVLCETFRKRLVLSV.KPAAQ
HGPRBMY9     .QPTLAFYVGYYLSICLSYASSSINPFLYILLSGNFQKRLPQIQ.RRATE
OPRK_MOUSE   TSHSTAALSSYYFCIALGYTNSSLNPVLYAFLDENFKRCFRD.FCFPIKM
OPRK_RAT     TSHSTAVLSSYYFCIALGYTNSSLNPVLYAFLDENFKRCFRD.FCFPIKM
SSR1_HUMAN   EQDDATVSQL...SVILGYANSCANPILYGFLSDNFKRSFQRILC.....
SSR1_MOUSE   EQDDATVSQL...SVILGYANSCANPILYGFLSDNFKRSFQRILC.....
SSR1_RAT     EQDDATVSQL...SVILGYANSCANPILYGFLSDNFKRSFQRILC.....
SSR4_HUMAN   TSLDATVNHV...SLILSYANSCANPILYGFLSDNFRRSFQRVLCLRCCL
SSR3_MOUSE   LPEEPAFFGLYFLVVALPYANSCANPILYGFLSYRFKQGFRRILLRPSRR
SSR3_RAT     LPEEPAFFGLYFLVVALPYANSCANPILYGFLSYRFKQGFRRILLRPSRR
SSR3_HUMAN   LPEEPAFFGLYFLVVALPYANSCANPILYGFLSYRFKQGFRRVLLRPSRR
SSR2_MOUSE   ISPTPALKGMFDFVVILTYANSCANPILYAFLSDNFKKSFQNVLC..LVK
SSR2_RAT     ISPTPALKGMFDFVVILTYANSCANPILYAFLSDNFKKSFQNVLC..LVK
SSR2_BOVIN   ISPTPALKGMFDFVVVLTYANSCANPILYAFLSDNFKKSFQNVLC..LVK
SSR2_PIG     ISPTPALKGMFDFVVVLTYANSCANPILYAFLSDNFKKSFQNVLC..LVK
SSR2_HUMAN   ISPTPALKGMFDFVVVLTYANSCANPILYAFLSDNFKKSFQNVLC..LVK
SSR5_MOUSE   LPEEPTSAGLYFFVVVLSYANSCANPLLYGFLSDNFRQSFRKALC..LRR
SSR5_RAT     LPEEPTSAGLYFFVVVLSYANSCANPLLYGFLSDNFRQSFRKVLC..LRR
SSR5_HUMAN   LPQEPASAGLYFFVVILSYANSCANPVLYGFLSDNFRQSFQKVLC..LRK
```

FIG. 6E

```
GPRO_HUMAN  GQLRAVSNAQTADEERTESKGT~~~~~~~~~~~~~~~~~~~~~~~~~~~~
GPRO_RAT    GQLRTVSNAQTADEERTESKGT~~~~~~~~~~~~~~~~~~~~~~~~~~~~
HGPRBMY9    KEINNMGNTLKSHF*~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
OPRK_MOUSE  RMERQSTNRVRNTVQDPASMRDVGGMNKPV~~~~~~~~~~~~~~~~~~~~
OPRK_RAT    RMERQSTNRVRNTVQDPASMRDVGGMNKPV~~~~~~~~~~~~~~~~~~~~
SSR1_HUMAN  LSWMDNAAEEPVDYYATALKSRAYS.....VEDFQPENLE.SGGVFRNGT
SSR1_MOUSE  LSWMDNAAEEPVDYYATALKSRAYS.....VEDFQPENLE.SGGVFRNGT
SSR1_RAT    LSWMDNAAEEPVDYYATALKSRAYS.....VEDFQPENLE.SGGVFRNGT
SSR4_HUMAN  LEGAGGAEEEPLDYYATALKSKGGAGCMCPPLPCQQEALQPEPG..RKRI
SSR3_MOUSE  IRSQEPGSGPP...EKTEEEEDEEEEERREEEERRMQRGQEMNGRLSQIA
SSR3_RAT    VRSQEPGSGPP...EKTEEEEDEEEEERREEEERRMQRGQEMNGRLSQIA
SSR3_HUMAN  VRSQEPTVGPP...EKT.EEEDEEEED..GEESREGGKGKEMNGRVSQIT
SSR2_MOUSE  VSGTEDG.......ERSDSKQD...KS.RLNETTETQRTL.LNGDLQTSI
SSR2_RAT    VSGAEDG.......ERSDSKQD...KS.RLNETTETQRTL.LNGDLQTSI
SSR2_BOVIN  VSGTDDG.......ERSDSKQD...KS.RLNETTETQRTL.LNGDLQTSI
SSR2_PIG    VSGTDDG.......ERSDSKQD...KS.RLNETTETQRTL.LNGDLQTSI
SSR2_HUMAN  VSGTDDG.......ERSDSKQD...KS.RLNETTETQRTL.LNGDLQTSI
SSR5_MOUSE  GYGVEDA.......DAIEPRPD...KSGRPQ.TTLPTRSCEANGLMQTSR
SSR5_RAT    GYGMEDA.......DAIEPRPD...KSGRPQ.ATLPTRSCEANGLMQTSR
SSR5_HUMAN  GSGAKDA.......DATEPRPD...RIRQQQEATRP.RTAAANGLMQTSK

GPRO_HUMAN  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
GPRO_RAT    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
HGPRBMY9    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
OPRK_MOUSE  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
OPRK_RAT    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
SSR1_HUMAN  CTSRITTL~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
SSR1_MOUSE  CASRISTL~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
SSR1_RAT    CASRISTL~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
SSR4_HUMAN  PLTRTTTF~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
SSR3_MOUSE  QAGTSGQQPRPCTGTAKEQQLLPQEATAGDKAST..LSHL
SSR3_RAT    QPGPSGQQQRPCTGTAKEQQLLPQEATAGDKAST..LSHL
SSR3_HUMAN  QPGTSGQERPPSRVASKEQQLLPQEASTGEKSSTMRISYL
SSR2_MOUSE  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
SSR2_RAT    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
SSR2_BOVIN  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
SSR2_PIG    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
SSR2_HUMAN  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
SSR5_MOUSE  L~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
SSR5_RAT    I~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
SSR5_HUMAN  L~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
```

FIG. 7

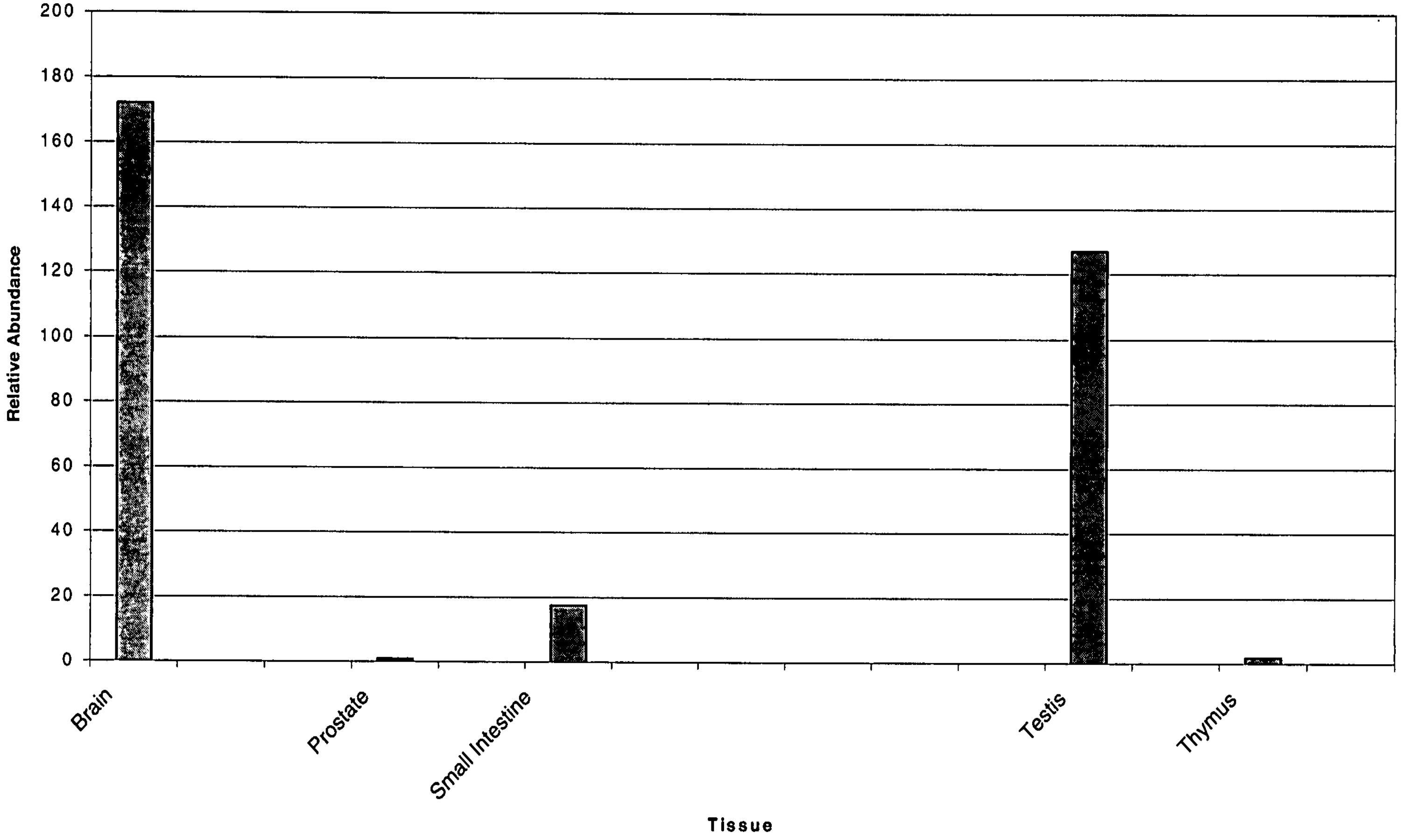

Relative Abundance
200
180
160
140
120
100
80
60
40
20
0
Brain
Prostate
Small Intestine
Testis
Thymus
Tissue

FIG. 8

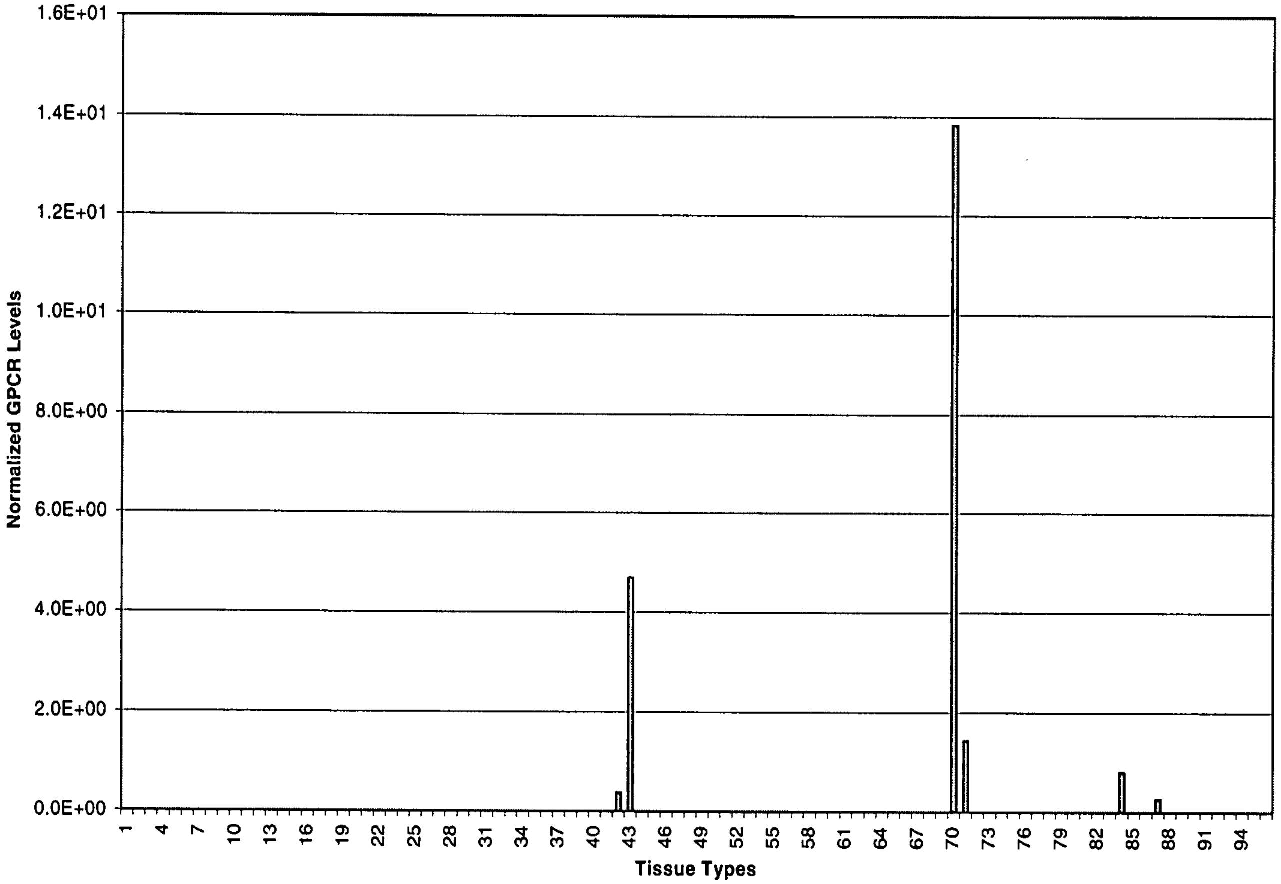

Normalized GPCR Levels
1.6E+01
1.4E+01
1.2E+01
1.0E+01
8.0E+00
6.0E+00
4.0E+00
2.0E+00
0.0E+00
1
4
7
10
13
16
19
22
25
28
31
34
37
40
43
46
49
52
55
58
61
64
67
70
73
76
79
82
85
88
91
94
Tissue Types

FIG. 9

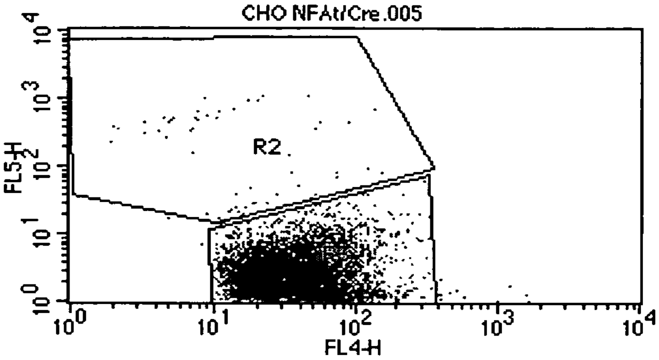

CHO NFAt/Cre.005
R2
FL5-H
FL4-H
10^0
10^1
10^2
10^3
10^4

FIG. 10

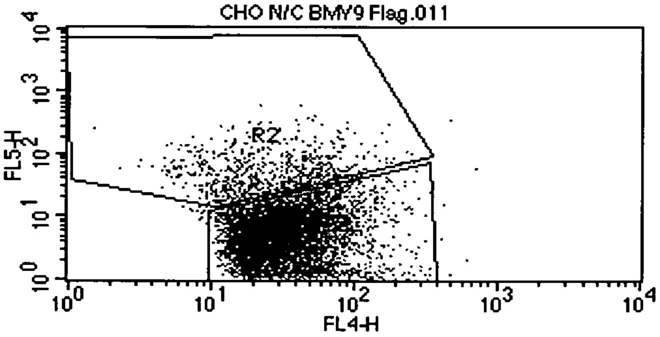
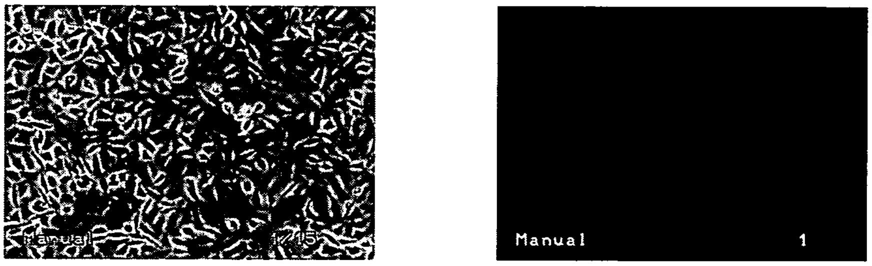

CHO N/C BMY9 Flag.011
R2
FL5-H
FL4-H
10^0
10^1
10^2
10^3
10^4

FIG. 11

a. CHO-NFAT/CRE (Bright Field vs. Fluorescent Image)



b. CHO-NFAT/CRE HGPRBMY9 (Bright Field vs. Fluorescent Image)

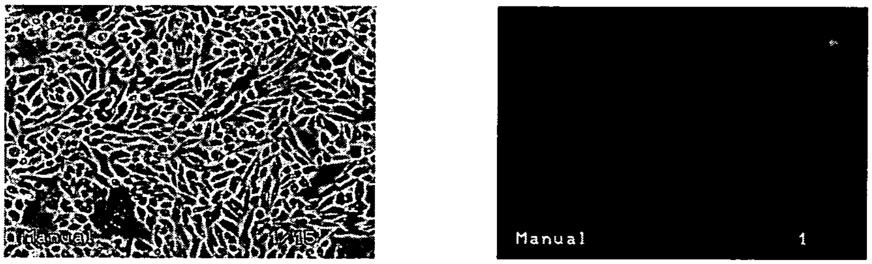
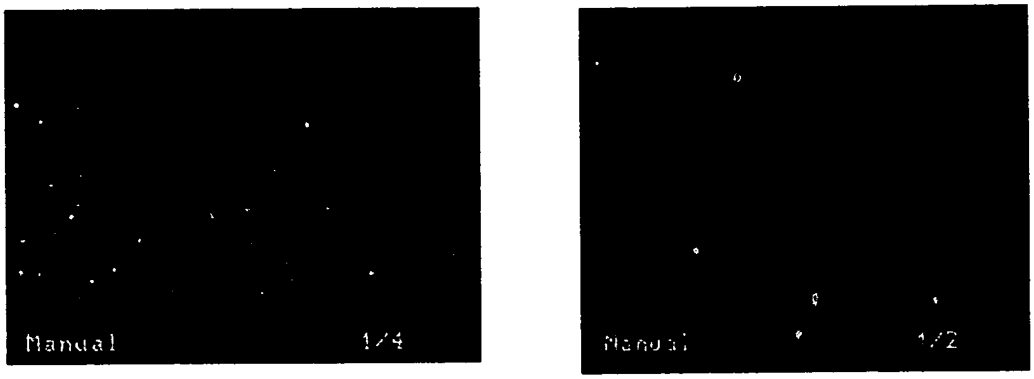


FIG. 12

a. CHO-NFAT/CRE

b. CHO-NFAT/CRE + P/T/F



c. CHO-NFAT/CRE oGPCR-Intermediate

d. CHO-NFAT/CRE oGPCR High

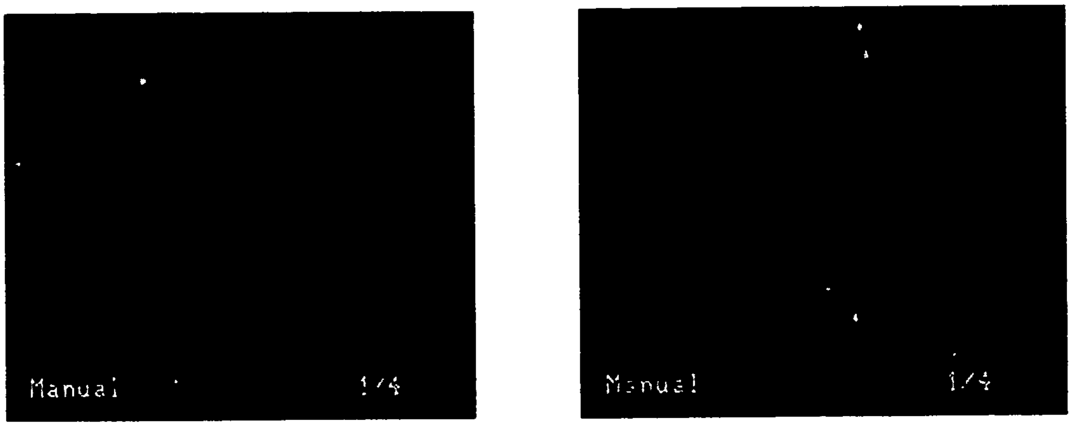


FIG. 13

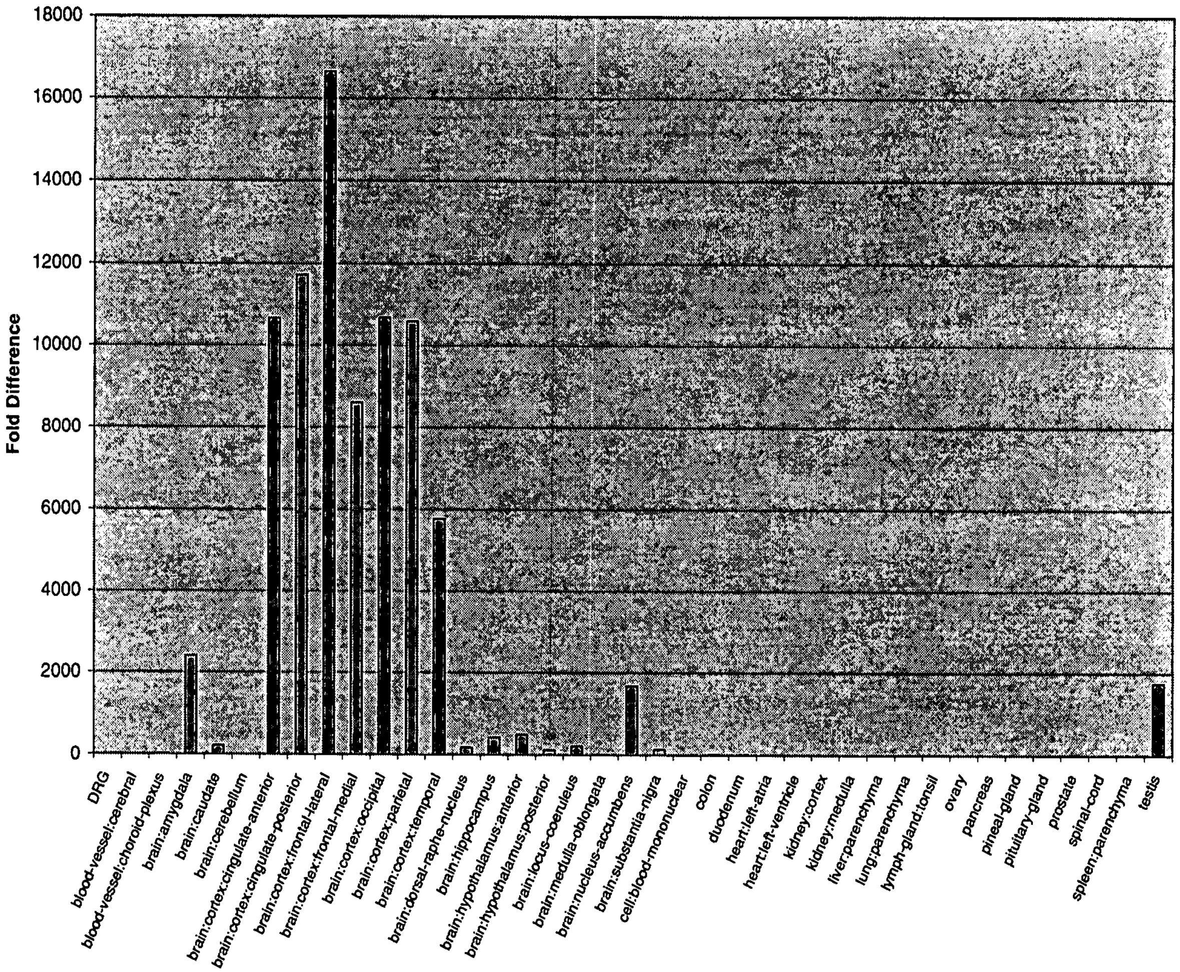

Fold Difference
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
DRG
blood-vessel:cerebral
blood-vessel:choroid-plexus
brain:amygdala
brain:caudate
brain:cerebellum
brain:cortex:cingulate-anterior
brain:cortex:cingulate-posterior
brain:cortex:frontal-lateral
brain:cortex:frontal-medial
brain:cortex:occipital
brain:cortex:parietal
brain:cortex:temporal
brain:dorsal-raphe-nucleus
brain:hippocampus
brain:hypothalamus:anterior
brain:hypothalamus:posterior
brain:locus-coeruleus
brain:medulla-oblongata
brain:nucleus-accumbens
brain:substantia-nigra
cell:blood-mononuclear
colon
duodenum
heart:left-atria
heart:left-ventricle
kidney:cortex
kidney:medulla
liver:parenchyma
lung:parenchyma
lymph-gland:tonsil
ovary
pancreas
pineal-gland
pituitary-gland
prostate
spinal-cord
spleen:parenchyma
testis

FIG. 14

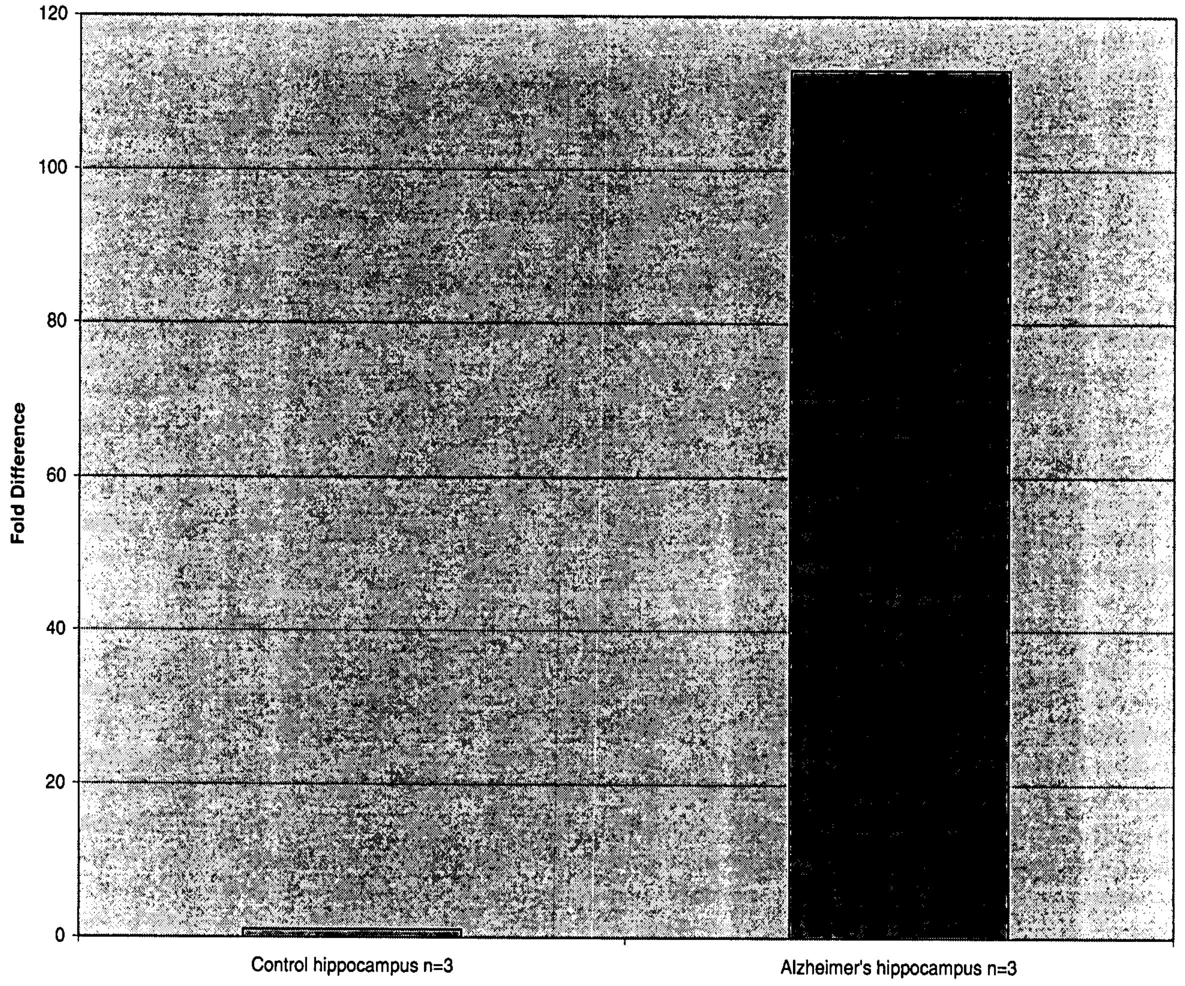
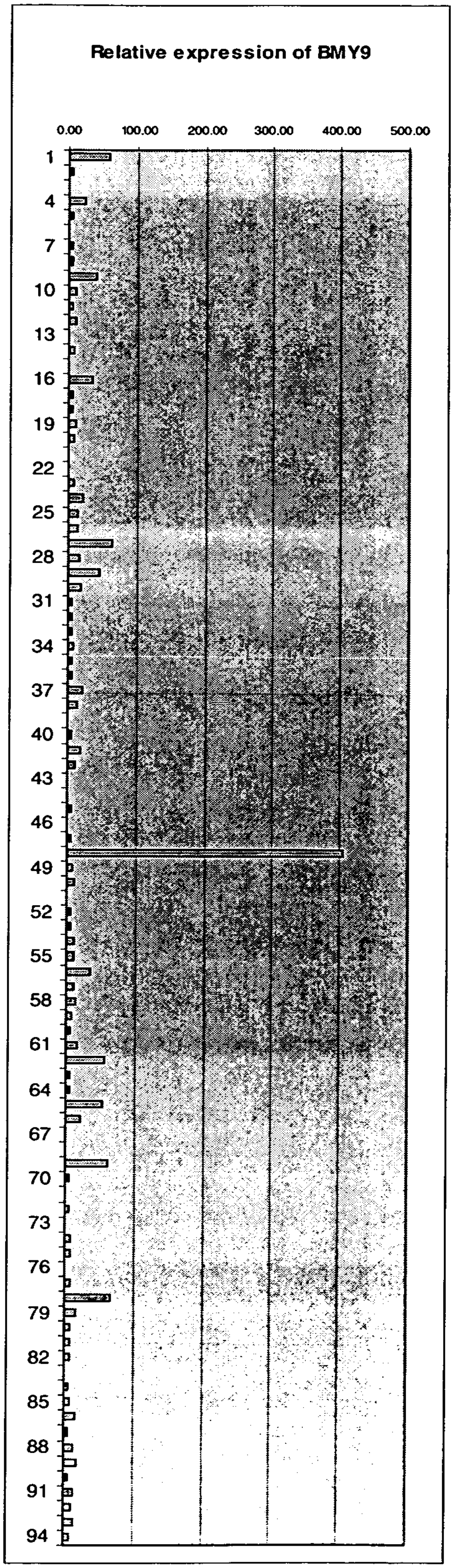

120
100
80
60
40
20
0
Fold Difference
Control hippocampus n=3
Alzheimer's hippocampus n=3

FIG. 15


Relative expression of BMY9
0.00
100.00
200.00
300.00
400.00
500.00
1
4
7
10
13
16
19
22
25
28
31
34
37
40
43
46
49
52
55
58
61
64
67
70
73
76
79
82
85
88
91
94